Shift-to-Shift Handoff Research: Where Do We Go From Here?

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Editor's Note: The online version of this article contains an appendix of mnemonics for aiding handoffs.

In 2001, the Institute of Medicine (IOM) reported that inadequate handoffs are "where safety often fails first." [1] Other groups quickly joined the call for improved handoffs. The Joint Commission in 2006 added a new National Patient Safety Goal: improve the effectiveness of communication among caregivers and require hospitals to "implement a standardized approach to 'handoff' communications, including an opportunity to ask and respond to questions." [2] Also in 2006, the World Health Organization Collaborating Centre on Patient Safety (Solutions), the World Alliance for Patient Safety, and the Commonwealth Fund joined to launch the "High 5s" initiative, which includes prevention of patient care handoff errors.[3]

In July 2003, the Accreditation Council for Graduate Medical Education (ACGME) enacted resident duty hour requirements to promote patient safety and resident well-being.[4] However, these work restrictions have produced unintended consequences, such as an increase in frequency of handoffs, institution of night float systems, a shift mentality, and an increased risk of preventable adverse events associated with coverage by a physician from another team.[5–7] Further ACGME duty hour restrictions became effective in July 2011.[8] For the first time, these included handoff requirements. Although referred to as "transitions of care," the requirements mostly refer to handoffs (BOX 1).

The first of the new ACGME requirements is to minimize patient care transitions, which is complicated by the fact that both the 2003 and 2011 resident duty hour restrictions are likely to increase the frequency of inpatient handoffs. Most institutions have not utilized a formal teaching program to teach handoffs to residents. The 2011 transitions of care language clearly calls for structured instruction, evaluation, and monitoring of handoffs. As a result, residencies across the country are struggling with how best to accomplish these new requirements. This editorial outlines a research agenda for shift-to-shift handoffs in medicine.

Definitions

Handoffs go by many names. A shift-to-shift handoff may be referred to as a handoff, handover, sign-out, shift change report, intershift report, shift-to-shift report, or, less frequently, transitions of care. For purposes of this article, I will use the term handoff to refer to the "process of transferring primary authority and responsibility for providing clinical care to a patient from one departing caregiver to one oncoming caregiver." [9] This term includes shift-to-shift handoffs, including handoffs for night-float and short-term coverage for a caregiver taking a break. Croteau[10] has defined a standardized approach to handoffs that has broad applicability (BOX 2).

It is important to differentiate shift-to-shift handoffs from a transition of care. Here, transitions of care refer to the movement of patients between health care locations or providers or different levels of care within the same location[11] as their conditions and care need change.[12] A review of the research on transitions of care between providers and settings is beyond the scope of this article, which focuses on shift-to-shift handoffs.

Magnitude of the Problem

According to the Joint Commission, "an estimated 80 percent of serious medical errors involve miscommunication between caregivers when patients are transferred or handed-off." [13] The Agency for Health Care Research and Quality conducts an annual survey of hospital patient safety culture. In 2011, 1032 hospitals and over 470 000 hospital staff responded.[14] Of these, 50% endorsed the statement that "important patient care information is often lost during shift changes." [14] Despite the need for improved handoff quality and safety, there is a paucity of evidence to support any specific strategies, which makes development of educational programs for residents problematic.[15]

Numerous authors have documented a lack of handoffs education. Van Eaton and colleagues[16] noted a need for

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BOX 1 Transitions of Care (ie, Shift-to-Shift Handoffs) in ACGME Common Program Requirements[a]

VI.B. Transitions of Care
VI.B.1. Programs must design clinical assignments to minimize the number of transitions in patient care.
VI.B.2. Sponsoring institutions and programs must ensure and monitor effective, structured hand-over processes to facilitate both continuity of care and patient safety.
VI.B.3. Programs must ensure that residents are competent in communicating with team members in the hand-over process.
VI.B.4. The sponsoring institution must ensure the availability of schedules that inform all members of the health care team of attending physicians and residents currently responsible for each patient's care.

[a]Accreditation Council for Graduate Medical Education (ACGME). Common Program Requirements. http://www.acgme.org/acWebsite/home/Common_Program_Requirements_07012011.pdf. Accessed November 13, 2011.

teachers to develop handoffs curricula and to model effective handoffs. Horwitz et al[17] noted that direct observation of physician oral or written handoffs rarely occurs. Many have acknowledged these gaps and have called for standardized, tailored curricular development.[18,19] However, a recent study found little evidence of educational intervention effectiveness,[20] which is not surprising given the lack of evidence to support the efficacy of specific handover strategies.

Next Steps for Handoff Research

It is essential to place greater emphasis on high-quality handoff outcomes studies focused on systems factors and human performance and the effectiveness of structured protocols, education, and evaluation. Much current research is specific to the department or institution and uses convenience samples, designs, and outcome measures. Future handoffs research should start with a conceptual framework that situates the research question and methodology within a theoretical framework[21] based on previous research results. These studies should use both

BOX 2 Croteau's Standardized Approach to Handoffs[10,a]

Identify:
The specific "handoff" situation
Who should be involved in the communication
The information that should be communicated
- Diagnosis and current condition of the patient
- Recent changes in condition or treatment
- Anticipated changes in condition or treatment
- What to watch for in the next interval of care

Opportunities to ask and respond to questions
When to use certain techniques (eg, repeat-back; SBAR[a])
What print or electronic information that should be available

[a]SBAR, situation, background, assessment, recommendation. Adapted from Croteau RJ. 2006 National Patient Safety Goals. PowerPoint. npsf.org/members/resources/SUPS-AudioConf-20051011.ppt. Accessed November 13, 2011.

BOX 3 Research Questions About Shift-to-Shift Handoffs by Content Domain[a]

Knowledge
- Define the knowledge required for effective handoffs
- Document accuracy of describing the handoff protocol

Attitude
- Report satisfaction with education received, current structure used, new structure implementation, actual handoff received, and/or technology solutions used
- Report comfort using the handoff system and/or providing handoffs
- Report perceptions of handoff quality from the perspective of the sender and receiver and document where, when, and why these perceptions differ

Skill
- Define the skills required for effective handoff
- Demonstrate ability to use the handoff system
- Document accuracy of information provided during handoff, extent to which the handoff contained all essential information (ie, did not include omission of important information or addition of inaccurate information); recall accuracy of content provided; and/or the extent to which there was a shared understanding of the information transferred during the handoff

Environmental aspects
- Identify the best time and location for handoffs to occur
- Document number of interruptions and varying noise and light levels and their effects on handoff quality
- Compare handoff quality under varying workload conditions for both the sender and receiver

Standardization
- Define the elements of a standardized, structured handoff and the ideal order of element presentation; document whether this approach results in improved handoffs and/or leads to unintended consequences; and document how this approach effects teamwork
- Define low-risk and high-risk handoff situations and describe how to prioritize the importance of specific information
- Document use of a protocol, checklist, or handoff mnemonic

Technology
- Document the ideal elements of an electronic handoff tool and describe why these elements are important and why other elements are not
- Document the effects of use of handoff technology on accuracy of information provided and received, identification of the responsible provider, and/or preventable adverse events
- Describe optimal use of the medical record during handoffs

Process outcomes
- Create a flow diagram of current handoff practice and identify opportunities for improvement
- Record usage of handoff system
- Document accuracy of information (content and quality) provided and/or received
- Describe the current handoff process, essential pre-handoff and handoff activities, and/or errors that occur during handoffs (rates and types of error)
- Define best practices in relation to standardization, implementation, educational, feedback, and/or evaluation strategies

Clinical outcomes
- Document reduction of handoffs-related errors as surrogate for increased safety
- Describe negative patient safety outcomes that may result from inadequate handoff quality (eg, delay in treatment, diagnosis, discharge; morbidity; mortality; patient and family member's satisfaction with care)
- Compare different protocols, educational strategies, and/or implementation strategies to determine which result in handoffs that improve patient outcomes

[a]All of the research suggestions above should be completed by discipline/department, as each area has different handoff requirements (ie, handoffs in labor and delivery require different elements than those in an intensive care unit or rehabilitation unit)

quantitative and qualitative designs, as each methodology yields different but important information. Research also should focus on individual aspects of handoffs, as well as on interactions between different parts of handoffs. In addition to the discussion that follows, I have developed a list of research questions for the future (BOX 3).

The Kirkpatrick model[22] for evaluating training interventions includes 4 levels: (1) reaction to training; (2) learning knowledge or skills; (3) behavior change and applying what was learned; and (4) evaluation of results or outcomes of training. Most handoff education research has included evaluation of the first two levels.[20] Only one study measured level 3, behavior change,[23] and to date, no handoff education studies have used level 4 evaluation, evaluation of the results of a handoff intervention.[20]

Patterson and Wears[9] concluded that the current literature base does not enable recommendations "for the use of any particular standardized, reliable measurement tools." Therefore, we must develop valid, reliable, and feasible measures of handoff quality. Another important area to study is the aspects of handoffs that result in receiver acceptance of responsibility.

The concept of handoff balance also is important. We should describe the optimal balance between being concise (less information but information that is very relevant) and being comprehensive (more information but information that can be easily found in other ways and is not necessary to provide during the handoff).

Calls for Standardized, Structured Handoffs

In a 2010 literature review, Cohen and Hilligoss[24] concluded that we currently lack a clear definition of what "to standardise" means and that implementation of standardized approaches have not "produced marked gains in measured patient outcomes." [24(p493)]

One direct result of efforts to develop standardized handoffs is the proliferation of mnemonics. The use of handoff mnemonics can increase memory recall and create explicit expectations of what should occur.[25] Our review of the literature (unpublished) and published systematic review of mnemonics[26] yielded 57 articles with 36 mnemonics (an Appendix is provided as online supplemental content). Thus, an inordinate number of handoff mnemonics exist with little evidence to support the use of any specific mnemonic.[26]

Although standardization of handoffs appears to be a laudable goal, flexibility is also required. Some situations call for an adaptive heuristic approach rather than a rigid structure to allow the handoff sender to report the most important information first.[27] For instance, in emergency situations, such as when one patient's condition is rapidly deteriorating, the handoff of all patients must include some flexibility to allow for the urgent care needs of the one while addressing the essential handoff components of other patients. This means that by necessity, the handoff will occur under less than ideal circumstances (eg, not in a quiet location, something thought to be important to successful handoffs).

Research AND Quality Improvement

While large-scale, multi-institution research studies are needed, we should not exclude small-scale, rapid cycle tests of change important in quality improvement (QI) and patient safety efforts. QI studies provide valuable insight into real-world problems and, because of their small sample sizes, may avoid unintended downstream negative consequences not considered at the outset. However, for these efforts to contribute to generalizable knowledge, they must be published. To result in publication, QI rapid-cycle testing should be conducted using publication guidelines for patient safety and quality initiatives.[28,29] Future handoff studies using QI methodologies should follow Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines.[29]

Functions and Phases of Handoffs

Current literature demonstrates the fact that handoffs perform important functions beyond patient safety.[24] The research focus and definition of a high-quality handoff will depend on the outcome on which the researcher chooses to focus. Handoffs can have multiple purposes: (1) information transfer; (2) shared decision making (critical review of current knowledge, discussion of the differential diagnosis, review of diagnostic and therapeutic options, and current documentation, as well as shared planning of next steps); (3) transfer of responsibility; and (4) social interaction and development of team solidarity (improved team atmosphere). Unfortunately, the tradeoff of these functions with safety considerations has not yet been identified.[24]

There are distinct phases of a handoff: (1) pre-work (anticipating and preparing for handoff); (2) actual handoff; (3) acknowledgement of information received; and (4) acknowledgement of transfer of responsibility. Each handoff phase requires unique knowledge and critical skills, each of which should be studied. Given the numerous purposes and phases of a handoff, researchers should provide operational definitions that clearly describe which of these are being studied.

Human Factors and Communication

Numerous authors have noted the importance of including human factors in future handoff research.[27,30,31] Human factors include all aspects of how humans interact with the world around them. One factor currently under study is resilience engineering. Resilience "refers to the ability,

within complex and high-risk organisations, to understand how failure is avoided and how success is obtained." [30(p256)] Here the focus is not on errors but on how health care professionals avert them.

The balance between effective communication and miscommunication is complicated by numerous human cognitive characteristics. Most speakers systematically overestimate the clarity and effectiveness of their communications.[32] Speakers assume that the receiver has the same knowledge that the speaker possesses, and the better you know the receiver of a handoff, the more you may overestimate the quality of what you have communicated and how much the receiver already knows.[32] This has been called an egocentric heuristic.[33]

During handoffs, the receiver often relies on the "clinical acumen and recall of the departing colleague." [34] This overestimation of the speaker, or sender, can result in what is called "diagnosis momentum." [35] The receiver simply accepts as fact what the sender said, without critically evaluating the evidence. In addition, most humans do not have perfect recall of every event. We tend to remember the gist of a conversation and fill in the gaps to support what we believe. Memory is not a camera allowing us to store all details. Memory is affected by personal biases, current mood, how tired or rested you are, and many other factors. These attributes of memory, communication, and miscommunication leave us with many rich areas for handoffs research.

Summary

There is increasing focus on handoffs and the role ineffective handoffs play in patient safety. Although this focus has resulted in an increased volume of published research, few studies have reported strategies that improved patient care outcomes. Research focused on teaching handoffs to residents has similarly demonstrated few successful educational interventions. Both areas of research have often been institution-specific or location-specific and not easily generalizable to other sites. Ideally, research demonstrating successful patient outcomes associated with specific handoff methods or elements would precede the development of trainee educational interventions, which must be informed by these strategies.

It is critical that handoff research uses a systematic approach based on a theoretical framework derived from previous research. Researchers should focus on the development of valid, reliable measurement tools; identify successful implementation strategies; and describe best practices for handoffs education and evaluation. To accomplish these important goals, we should collaborate with human factors engineers, cognitive psychologists, linguists, and other disciplines to help answer complex handoffs questions.

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